

# Hip Training Programs for Endurance Athletes

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**S**trengthening exercises for the hips should be performed in all sport specific training programs. Sports medicine researchers have begun to recognize that weakness in the hips may contribute to hip injuries or other lower extremity injuries (1,2). Despite the significant role that the hips play in lower extremity biomechanics and power generation, many training programs either fail to adequately train the hips or omit core training altogether. Sports medicine researchers have begun to recognize that weakness in the hips may contribute to hip injuries or other lower extremity injuries (1,2). In particular, endurance athletes, especially female cross-country runners are at risk for lower extremity injuries (4,5). The aforementioned authors also identified that cross-country athletes may experience a recurrence of an injury during the same season (4,5). Selected muscles that make up the hip are listed in table 1.

So what can be done to decrease a cross-country athlete's risk of injury? Gone should be the days in which an athlete's complete lower extremity routine consists only of the leg press, the knee extension machine, and a hamstring curl machine. Instead, coaches and athletes

need to be able to recognize when an athlete is functionally weak in his or her hip musculature and correct this with specific exercise strategies.

## Identifying Functional Hip Weakness

Clinically, I have observed weakness in the hip with both the use of manual and functional muscle testing. While a manual muscle test is a test performed by sports health professionals, anyone can observe functional hip weakness watching an athlete perform a single leg squat or lunge.

A single leg squat can help identify hip abductor weakness in athletes, especially female athletes (6). Prior to performing

the test, place a chair or stool behind yourself. Stand on a single leg with the opposite leg off the ground. To perform the test, squat toward the chair or stool (which is set at a height allowing a knee flexion angle of 45 degrees) (figure 1). When observing either the single leg squat or a lunge, pay close attention to the lower extremity alignment. One indicator of hip weakness is the inability to maintain the knee in alignment with the hip or foot when squatting or lunging (figure 2).

## Training the Hips

If you demonstrate functional hip weakness, begin with the phase I training program (table 2). Perform each exercise for two to three sets of 15 to 20 repeti-

**Table 1. Selected Muscles of the Hip (3)**

Muscle	Functions on Hip Joint
Gluteus maximus	Extends thigh, assists external rotation
Gluteus medius	Abducts and internally rotates thigh
Gluteus minimus	Abducts and internally rotates thigh
Piriformis Obturator internus Gemelli, superior & inferior	Externally rotates extended thigh, abducts flexed thigh
Quadratus femoris	Externally rotates thigh
Obturator externus	Externally rotates thigh

tions. Once able to demonstrate optimal hip-knee-foot alignment with the single leg squat and a lunge, advance to the phase II exercises.

### Side lying hip abduction (figure 3)

While lying on one side, raise the top leg six to eight inches. Often this exercise is performed incorrectly with a substitution pattern created by stronger anterior hip muscles. To correct for any form deviations, lie on the ground with your back against a wall. Now when you raise your leg maintain your heel against the wall. As able, add ankle weights to further develop strength.

### Prone hip extension exercise

Assume a prone position and bend one leg to 90 degrees of flexion. Lift the thigh off of the surface two to four inches, lifting from your hip and avoiding spine extension.

### Single leg balance with one arm row (figure 4)

While balancing on one leg, perform a one-arm row using a cable or band on the opposite side. The key to this exercise is to maintain optimal hip-knee-ankle alignment as you perform the row against the resistance provide by either a pulley or exercise band.

### Side bridge (figure 5)

Assume the position shown with only the forearm and feet in contact with the ground. Perform repetitions on each side. In phase II of this program, perform the side bridge position while abduction the top leg off the bottom leg (figure 6).

## Conclusion

Isolating weak hip muscles in phase I should help to improve any faulty lower extremity biomechanics. Failing to correct for weakness in the hip may minimize the effectiveness the phase II exercises. The phase II exercises (squats, lunges) should be performed as part of a comprehensive lower extremity strength training program.

## References

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## About the Author

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### Table 2. Hip Strengthening Program

#### Phase I

Perform these exercises for 2 – 3 sets of 15 to 20 repetitions, 2 days a week:

- Side lying hip abduction
- Prone hip extension
- Single leg balance with shoulder row

Perform this exercise for 2 – 3 sets of 10-second holds each side, 2 days a week

#### Phase II

Perform these exercises for 2 – 3 sets of 10 repetitions, 2 days a week

- Squats
- Lunges

Perform 1 – 2 sets of 10 – 15 repetitions, 2 days a week

- Side bridge with straight leg raise

**Figure 1. Single leg squat test**



**Figure 2. Poor lower extremity biomechanics observed during a lunge**



**Figure 4. Single leg balance with one arm row**



**Figure 3. Side lying hip abduction**



**Figure 5. Side bridge**



**Figure 6. Side bridge with hip abduction**

